

ARCHIVES OF PEDIATRICS

A MONTHLY DEVOTED TO THE
DISEASES OF INFANTS AND CHILDREN

JOHN FITCH LANDON, M.D., Editor

LEADING ARTICLES IN THIS NUMBER

Tics (Habit Spasms) Secondary to Sinusitis.

Edward E. Brown, M.D., F.A.A.P. 39

Dermatitis of the Diaper Region.

A New Remedy for an Old Affliction.

Henry W. Kaesler, M.D. 47

Capillary Fragility of the Newborn Infant.

Stanley Burrows, M.D. 51

The Epidemiology of Myopia.

Hubert S. Bush, Jr. 58

Pediatrics at the Turn of the Century.

Status Lymphaticus and Enlargement of the Thymus.

With Report of a Case Successfully Treated

by the X-ray.

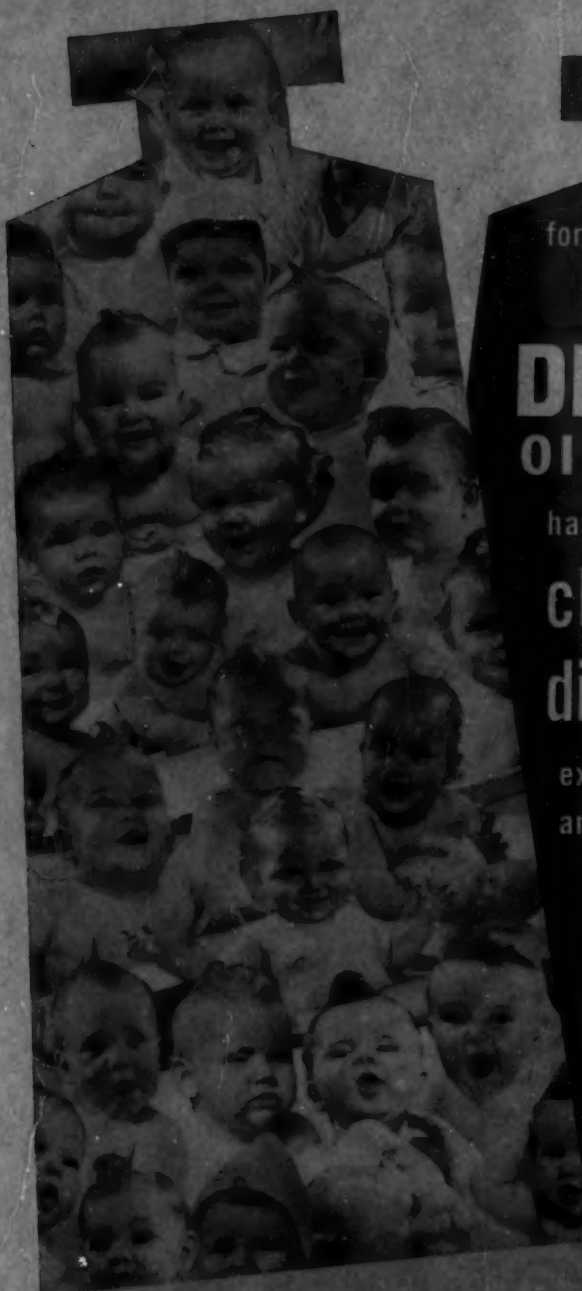
Alfred Friedlander, M.D. 67

E. B. TREAT & CO., Inc., Publishers, 45 East 17th Street, NEW YORK 3

Yearly Subscription \$6.00 (Foreign \$6.75); Single Copy, \$1.00

COPYRIGHT, 1957, BY E. B. TREAT & CO., INC. ALL RIGHTS RESERVED

Entered as second-class matter Feb. 5, 1892, at New York, N. Y., P. O., under the Act of March 3, 1879



for over a quarter
of a century

DESITIN[®] **OINTMENT***

has prevented and
cleared up
diaper rash

excoriation, chafing
and irritation in

more
babies

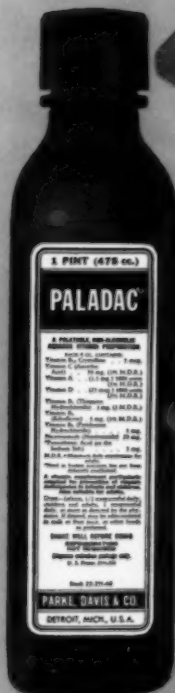
than any other
ethical product

**rich in
cod liver oil*

Samples on request

DESITIN CHEMICAL COMPANY
812 Branch Ave., Providence 4, R. I.

real kid stuff



PALADAC[®]

liquid
vitamin
supplement

- delicious orange flavor
- nine nutritionally important vitamins
- flows freely, needs no refrigeration
- may be added to milk or fruit juice, or taken directly from the teaspoon

supplied: 4-ounce and 16-ounce bottles.



PARKE, DAVIS & COMPANY • DETROIT 32, MICHIGAN

00000

TO CONTRIBUTORS AND CORRESPONDENTS OF ARCHIVES OF PEDIATRICS

Subscription \$6.00 a Year, in Advance

Foreign \$6.75

Single Copy, \$1.00

Editorial Communications address to JOHN F. LONDON, M.D., 120 East 75th Street, New York 21

Business Communications address to E. B. TREAT & Co., INC., 45 East 17th Street, New York 3

ORIGINAL ARTICLES, brief reports of rare and interesting cases, or new modes of treatment are solicited, but none will be considered for publication except with the distinct understanding that it is contributed exclusively to this journal. Manuscripts must be typewritten, double-spaced, and the original, not the carbon, copy submitted. The editor and publishers will not be responsible for views expressed.

ILLUSTRATIONS, as in the judgment of the editor are necessary, will be furnished free when satisfactory photographs or drawings are supplied. Photographs must be clear and distinct; drawings must be in India ink on white paper.

COPYRIGHT.—Original communications appearing in this journal are protected by copyright and can not be reproduced, either wholly or in part, without permission of the publishers.

REPRINTS of articles appearing among "Original Communications" may be ordered immediately upon receipt of galley proof by communicating direct with the publishers, E. B. Treat & Co., Inc., 45 East 17th Street, New York 3, who will supply their schedule of prices.

DISCONTINUANCES.—The publishers must be notified when a subscriber wishes his journal stopped and all arrearages must be paid. Without such notification it is assumed that a continuance is desired. Journals returned are not notice of discontinuance.

REMITTANCES should be made by check, draft, post office or express money order. If currency is sent, the letter should be registered. Stamps in amounts under one dollar are acceptable.

CHANGE OF ADDRESS NOTICE should give both the old and the new and state if change is permanent or temporary.

CONTENTS

ORIGINAL COMMUNICATIONS

Tics (Habit Spasms) Secondary to Sinusitis.

EDWARD E. BROWN, M.D., F.A.A.P. 39

Dermatitis of the Diaper Region.

A New Remedy for an Old Affliction.

HENRY W. KAESSLER, M.D. 47

CLINICAL REVIEW

Capillary Fragility of the Newborn Infant.

STANLEY BURROWS, M.D. 51

The Epidemiology of Myopia.

HUBERT S. BUSH, JR. 58

(Continued on page 4)

Sigmamycin^{*}

OLEANDOMYCIN TETRACYCLINE

added certainty
in treatment
of respiratory
infections

new multi-spectrum synergistically strengthened antibiotic formulation

SIGMAMYCIN adds certainty in antibiotic therapy, particularly for the 90% of patients treated at home or in the office where sensitivity testing may not be practical, and provides: a new maximum in therapeutic effectiveness, a new maximum in protection against resistance, a new maximum in safety and toleration.

Supply: Capsules, 250 mg. (oleandomycin 83 mg., tetracycline 167 mg.). Bottles of 16 and 100.

... and for a new maximum in palatability

New mint-flavored Sigmamycin for Oral Suspension, 1.5 Gm. in 2 oz. bottle; each 5 cc. teaspoonful contains 125 mg. (oleandomycin 42 mg., tetracycline 83 mg.).

^{*}Trademark



PFIZER LABORATORIES, Division, Chas. Pfizer & Co., Inc., Brooklyn 6, N. Y.
World leader in antibiotic development and production



"...effective...in the treatment of a variety of infections seen regularly by the practicing clinician..." including pharyngitis, bronchitis and other respiratory infections

and "... often useful in the treatment of infections due to staphylococci resistant to one or several of the regularly used antibiotics"

"side effects ... [are] notable by their absence"¹

1. Carter, C. H., and Maley, M. C.: Antibiotics Annual 1956-1957, New York, Medical Encyclopedia, Inc., 1957, p. 51.

(Continued from page 2)

PEDIATRICS AT THE TURN OF THE CENTURY

Status Lymphaticus and Enlargement of the Thymus.

With Report of a Case Successfully Treated by the X-ray.

ALFRED FRIEDLANDER, M.D. 67

DEPARTMENT OF ABSTRACTS

- WATKINS, C.: The Use of Reserpine in Cerebral Palsy..... 78
- WOLFF, A. M., et al.: Immunogenicity in Children of Ultraviolet-Treated
Poliomyelitis Vaccine 78
- SHWACHMAN, H. and GAHM, N.: Studies in Cystic Fibrosis of the Pancreas.
A Simple Test for the Detection of Excessive Chloride on the Skin..... 79
- D'ABREU, A. L. and PARSONS, C.: Surgical Treatment of Children with
Coarctation of the Aorta..... 79

BOOK REVIEWS

- Congenital Anomalies of the Viscera. Their Embryological Basis.
By J. LEWIS BREMER, M.D..... 80
- Children's Eye Problems. By EMANUEL KRIMSKY, M. D..... 80

ITEMS

- Chronic Abdominal Pain in Children..... 46
- Gastric Digestion of Homogenized Milk in Infants..... 66

EFFECTIVE TREATMENT AND PREVENTION OF Diaper Rash

Diaparene Chloride Ointment 93% effective
in the treatment of ammonia dermatitis.

The case illustrated cleared in 4 days.

I. Niedelman, M. L. and Bleier, A., Jnl. Ped.
37:762, 1950.



PHARMACEUTICAL DIVISION, HOMEMAKERS' PRODUCTS CORPORATION • 380 SECOND AVE., NEW YORK 10, N. Y.

For Infectious Diarrhea

THE FULL ATTACK...

Antibacterial
Adsorptive
Protective

Streptomagma combats bacterial diarrhea with multiple forces. It offers dihydrostreptomycin to control the streptomycin-susceptible organisms. Simultaneously, its pectin, kaolin, and alumina gel soothe the irritated bowel, promote development of well-formed stools, and aid in the removal of bacterial toxins and irritants.



Philadelphia 1, Pa.

STREPTOMAGMA[®]

Dihydrostreptomycin Sulfate and Pectin with Kaolin in Alumina Gel

Pick-of-the-crop Apples



Another reason why you can recommend Beech-Nut with confidence

Beech-Nut apples are the pick of the crop from the finest orchards. So perfect they can be cooked with the red skins on them so that precious vitamins directly beneath the skin are preserved. It's with good reason doctors recommend Beech-Nut confidently.

BEECH-NUT BABY FOODS, CANAJOHARIE, NEW YORK

*Trust Beech-Nut...
carefullest baby feeders
in the world*



ARCHIVES OF PEDIATRICS

Vol. 74

FEBRUARY 1957

No. 2

JOHN FITCH LANDON, M.D., Editor

EDITORIAL BOARD

HAROLD R. MIXSELL, M.D., New York	PHILIP M. STIMSON, M.D., New York
FREDK. H. WILKE, M.D., New York	JOHN ZAHORSKY, M.D., St. Louis
P. W. BRAESTRUP, M.D., Hellrup, Denmark	RONALD N. MacLEAN, M.D., Buenos Aires, Argentina
Y. NISHIZAWA, M.D., Osaka, Japan	ROALD RINVAK M.D., Oslo, Norway

TICS (HABIT SPASMS) SECONDARY TO SINUSITIS

EDWARD E. BROWN, M.D., F.A.A.P.

Ashland, Ore.

Tics (habit spasms) in children profoundly affect the observer and demoralize the child. Attempts at correction by parent and physician are usually futile.^{1, 2}

From observation over many years, I am convinced that tics are almost invariably secondary to purulent secretions and toxemia from chronic sinusitis, and that treatment of this source is rewarding. The records of 34 tic patients were reviewed. Eight patients whom I photographed illustrate the type of tics and some of the visible signs of sinusitis encountered. More complete findings are summarized in Table 1.

The constancy with which chronic sinusitis produces habit spasms seems to have been observed by but few physicians.^{3, 5} Selling, in 1929, considered tic an infectious disease originating in the sinuses, particularly the antra.⁴

That chronic sinusitis is responsible for most tics may be deduced from three kinds of evidence, as follows: (1) the tic is usually a symptom of sinusitis; (2) the tic is initially purposeful in relation to sinusitis; and (3) seasonal variations in the incidence of tics correspond with bacterial activity in sinusitis. This evidence is discussed.

1. *Tic as symptom of sinusitis.* The type of tic usually encountered is in most instances a symptom of sinusitis, particularly at the onset. Other symptoms of sinusitis, of which some fifty were described,⁶ always accompany habit spasms (Table 1). Tics related to sinusitis include blinking, sniffing, hacking and nose twitching. When such habit spasms are noted, physical examination will reveal several of twenty-two signs of sinusitis, previously



Fig. 1-A. Boy aged 4 with tics such as blinking, frowning, nose and mouth twitching, shoulder jerking, of 1 month's duration associated with acute sinusitis.



Fig. 1-B. Six weeks later, cured.

described,⁷ including dark circles under the eyes, puffs beside the nose, mouth-breathing, nasal obstruction, tenderness of one or more sinuses (Fig. 3B), and/or tenderness of the eyeballs, the latter frequently denoting sphenoiditis.^{8, 9}



Fig. 3-A. Chronic pansinusitis, with tics of 1 year duration; note broad base of nose caused by sinusitis; mouth and nose twitching to right.



Fig. 3-B. Severe tenderness of ethmoid-antral area. Note also exaggerated puffs beside nose.

2. *Tic serving purpose in sinusitis.* Although most habit spasms are often said to be purposeless, the three most commonly observed

TABLE 1

Case No. Sex	Age in years	Duration of Tic	Type of Tic	Symptoms of sinusitis	Results after treating sinusitis
1. M. (Fig. 1)	4	1 month	blinking, frowning, nose and mouth twitching, shoulder jerking	anorexia; abdominal pain, headaches; fetor oris; restlessness; marked perspiration; mouth-breathing; puffs under eyes, marked tenderness of ethmoids and antra; mild cervical adenitis	6 weeks later (Fig. 1B), cured except for occasional sniff
2. M.	6	occasional blinking in past year; severe in past 2 days following a head cold	blinking	frequent colds; catarrhal otitis media; partial deafness; nasal obstruction; mouth-breathing; puffs beside nose; marked tenderness of ethmoids and antra	2 days later, improved; 3 months later, cured
3. M.	6	2 years	sniffing, mouth jerking, nose twitching, tongue sucking, ear pulling	sniffing, hacking; photophobia; mouth-breathing; fidgeting; malnutrition; marked tenderness of all sinuses; cervical adenitis	later, markedly improved; continues improved 2 years later
4. M. (Fig. 2)	7	1 year improving in summer, returning in fall	blinking; wrinkling and twitching of nose; mouth jerking	anorexia in a.m.; nosebleeds; leg aches; abdominal pains; grinds teeth; photophobia; "squinting"; sniffing; hacking; fatigue; low-grade fever; purpuric spots; moderate tenderness of all sinuses; submaxillary and cervical nodes	2 weeks later, markedly improved and returned to school
5. F. (Fig. 3)	10	1 year	mouth and nose twitching, usually to right, occasionally to left	light breakfast; pavor nocturnus; sniffs frequently; bruises easily; tonsils injected; all sinuses tender (Fig. 3B); cervical adenitis	not followed
6. M.	10	4 years	blinking, nose twitching, mouth jerking to right and left	asthenopia; photophobia; sniffing; hacking; abdominal pain; slight stutter at times; restlessness; anemia; puffs beside nose; marked tenderness of all sinuses; cervical adenitis	markedly improved in one month; tics not noted one year later
7. M.	22	15 years	blinking of right eye; spasm of right mouth	frequent headaches; anorexia upon arising; fetor oris; photophobia; asthenopia; constant sniffing and hacking; tinnitus; vertigo; occasional stiff neck and rheumatic pains; tenderness of right frontal and right eye	cured in one month, no further tics in next 2 years
8. M.	4	1 year	ear pulling, tongue sucking	frequent colds; leg pains; night-mares; mouth-breathing; circles under eyes; broad base of nose; moderately tender sinuses	improved immediately

initially are purposeful in relation to sinusitis. They are blinking, nose twitching and hacking. These tics are discussed.

Blinking (blepharospasm) is usually the first habit spasm to appear and is the most frequent of all tics.³ It was present in 47 of 100 consecutive cases of habit spasm under the care of Still. Blinking may develop after a cold,¹⁰ or exacerbation of a chronic sinusitis;¹¹ this tic seems to be a protective maneuver against photophobia secondary to sinusitis.^{8, 12} As a symptom of sinusitis it was reported by Still,³ and by Ashley.¹³ Blinking may be unilateral or bilateral, the latter being more common, and it is sometimes described by parents as "screwing up the eyes."³



Fig. 2 A-B. Blinking, wrinkling ("screwing") and twitching of nose; mouth jerking in boy who sniffed and hacked constantly, because of chronic sinusitis.

Nose twitching develops after months or years of sniffing. In unilateral sinusitis, twitching appears on the same side. In pansinusitis, twitching may shift from one nostril to the other in an attempt to sniff up secretions which reach the nares from the sinuses.

Hacking (clearing of the throat) and hawking may develop into habit spasms in victims of active chronic sinusitis and may be preceded by inspiratory sniffing of mucopus. Gött¹⁴ describes a hawking tic as an effort to dislodge adherent secretions in the pharynx, and Still³ describes "curious sounds," "hawking" and an audible "hem." The shrewd observations of Still in regard to nose twitching and hacking are summarized: "In the nose I have seen inflammation of the mucous membrane on the septum associated with a constantly recurring screwing up of the nose, and I doubt not that sometimes the 'clearing of the throat' which

becomes a habit and is replaced subsequently by other entirely different habits, may be started by some temporary nasopharyngeal catarrh or by the more chronic catarrh."

Ear pulling is occasionally a habit spasm encountered in children with active chronic sinusitis. It is well known that otitis may result from sinusitis.¹⁵ Initially, the pain of otitis may cause the child merely to rub his ear; later, this purposeful reflex becomes a useless habit in the form of ear pulling or ear picking.

Purposeless habit spasms usually appear later than the purposeful spasms described above. They include eyebrow twitching, head and shoulder jerking.

3. *Seasonal variations in tic and sinusitis.* Seasonal variations exist in habit spasms of children.¹⁰ Tics are seldom initially encountered in the warm summer months, and habit spasms already established tend to ameliorate at this time. This conclusion is based on observations of children on whom I have records. No chronic focus of infection approaches sinusitis in such seasonal activity.⁸

In colder weather habit spasms may follow such contagious diseases as influenza, scarlet fever, diphtheria,¹⁰ these diseases frequently being complicated by chronic sinusitis.⁸

Toxins from chronic sinusitis may be the common etiologic factor in the intimate relationship between habit spasms, chorea and rheumatic fever. Chorea and rheumatic fever are known to have their highest incidence in winter and spring. Habit spasms often precede chorea and may persist after chorea has run its course.⁵ Rheumatic children, all of whom have a chronic sinusitis,¹⁰ the probable cause of rheumatic fever,¹⁷ frequently have persistent habit spasms.³

It is often difficult to distinguish tics from chorea.^{3, 18} It would seem that, whereas most tics are produced by local irritation in or adjacent to the nose, sinuses and throat, in chorea there is an overwhelming absorption of toxin from chronic sinusitis,⁸ the toxin penetrating tender cervical nodes and bombarding the central nervous system, producing "athetoid conditions."¹⁹ in scarlet fever, I²⁰ reported generalized twitching as a result of this mechanism. I noted the twitching of scarlet fever patients in a ward, while determining their capillary resistance. In severe scarlet fever it is difficult for a child to hold a suction cup over the antecubital space of his other arm without twitching his arms

and facial muscles, thus simulating a mild chorea. When storms occurred, restlessness, jerking and athetoid movements were augmented, aches were more severe and capillary fragility increased, presumably because of increased amounts of streptococcus toxin.²⁰

Headaches, abdominal pain,²¹ and joint pains are common in children with habit spasms³ and are often caused by sinusitis.

Older children and adults with habit spasms of the eye, nose and mouth almost invariably have an active chronic sinusitis. History reveals the existence of frequent colds and other symptoms of sinusitis since childhood and many ticquers previously have had chorea.^{2, 22, 23} Hoch²² states that the individual who had suffered from chorea "later on maintains some of the chronic manifestations in the form of tics." Such individuals are usually chronic sniffers and hackers.

While emotional insults and imitation are commonly emphasized as causing tics, in my experience these have been infrequent incitants.

TREATMENT

Treatment of habit spasms must be directed to the cause. Emotional insults, although they seldom produce tics, should be corrected for they aggravate tics. Imitation was not encountered in any of my 34 cases. Physical causes should be corrected, such as a tight collar, a long lock of hair or a refractive error. A habit like twisting of the neck may require the removal of a tight collar; jerking of the head may be relieved by cutting a lock of hair which obstructs vision; correcting a refractive error may improve blinking.⁵ These examples are cited, but they are rare and were not encountered in this series.

Treatment of nasal obstruction⁵ and chronic sinusitis^{3, 4, 16} has given excellent results. Selling⁴ reported cures in three cases by radical treatment of infected sinuses. My treatment was conservative. It consisted of teaching parents and older children the use at least twice daily of proper nasal astringents (nose drops or spray), and the use of hot wet towels to the face after first applying cold cream; sleeping with the head elevated;²⁴ avoiding prolonged recumbency;²⁴ and avoiding chilling,²⁵ fatigue, allergens and emotional upsets. During acute exacerbations of chronic sinusitis, penicillin was prescribed.

RESULTS

Improvement in tics was noticed within several days in almost all cases. Several children, removed from school because of merciless teasing, were returned to school in a week or two. Other children, previously treated unsuccessfully with barbiturates, also responded quickly. In cases of less than two months' duration, cures were rapid but were obtained even after years of persistence (Case 7).

CONCLUSIONS

1. Tics or habit spasms of children are almost invariably caused by chronic sinusitis, a condition frequently undiagnosed.
2. The most common habit spasms include blinking, nose twitching and mouth jerking.
3. Most tics are initially purposeful. Blinking is protective against the photophobia of sinusitis. Sniffing removes accumulated nasal secretions and may eventuate into a concomitant twitch of the nose. Hacking often immediately follows sniffing and is an attempt to clear the throat of mucopus which reaches the pharynx; a habit spasm producing a variety of strange noises may be noted in older children.
4. Toxins, when under tension in infected sinuses, enlarge cervical nodes and pass into the circulation, producing many systemic symptoms, including new tics. Some of these resemble chorea, which sometimes is actually present.
5. Treatment of chronic sinusitis is the main measure to quickly abate most habit spasms of children.

REFERENCES

1. Spock, B.: Some Common Diagnostic Problems in Children, *M. Clin. North America*, 34:1079, July 1950.
2. Holt and McIntosh: *Holt's Diseases of Infancy and Childhood*, 12th Ed., New York, 1953.
3. Still, G. F.: *Common Disorders and Diseases of Childhood*, pp. 556-568, London, 1909.
4. Selling, L.: Role of Focal Infections in the Etiology of Tics. *Arch. Neurol. & Psychiat.*, 22:1163, Dec. 1929.
5. Sach, B.: *A Treatise on the Nervous Diseases of Children*, p. 136, New York, 1895.
6. Brown, E. E.: Fifty Symptoms of Chronic Sinusitis in Children with Differential Diagnosis of Each Symptom. *ARCH. PEDIAT.*, 67:503, Nov.; 67:553, Dec. 1950.
7. Brown, E. E. and Wasson, V. P.: Clinical Diagnosis of Chronic Sinusitis. *Arch. PEDIAT.*, 59:723, Nov. 1942.
8. Brown, E. E.: Focal Infection (in preparation).
9. Zytowitsch, M. F.: Sensitivity on Palpation of the Eyeball as a Symptom of Sinus Disease. Abstract, *Klin. Monatsbl. f. Augenh.*, 85:310, Aug. 1930.
10. Albrecht, H.: Ueber die Ticerscheinungen im Kindesalter. *Nervenarzt*, 20:314, 1949.
11. Brown, E. E.: Common Cold Not Caused by Virus. *Northwest Med.*, 44:39, Feb. 1945.
12. Harrison, W. J.: Chronic Nasal Sinus Inflammation. *Practitioner*, 114:298, April 25, 1925.
13. Ashley, R.: Sinus Disease in Children. *Calif. & West. Med.*, 40:156, March 1934.

14. Gött, T., in Pfaundler and Schlossmann: Diseases of Children, 5:330, 1935.
15. Brown, E. E.: Harmful Sequelae of Adenoidectomy in Children with Chronic Sinusitis. *ARCH. PEDIAT.*, 71:233, Aug. 1954.
16. Brown, E. E. and Wasson, V. P.: Incidence of Chronic Sinusitis in Rheumatic Children. *ARCH. PEDIAT.*, 59:735, Nov. 1942.
17. Brown, E. E.: Cause of Rheumatic Fever—Chronic Sinusitis. *ARCH. PEDIAT.*, 68:565, Dec. 1951.
18. Strecker, E. A. and Ebaugh, F. G.: Practical Clinical Psychiatry. 5th Ed., p. 635, 1940.
19. Dunn, A. D. and Dunn, F. L.: Paranasal Sinusitis—A Problem in General Practice. *Ann. Int. Med.*, 6:235, Aug. 1932.
20. Brown, E. E.: Capillary Resistance in Scarlet Fever. *ARCH. PEDIAT.*, 57:553, Sept. 1940.
21. Brown, E. E.: Recurring Abdominal Pain in Children Secondary to Sinusitis. *ARCH. PEDIAT.*, 72:1, Jan. 1955.
22. Hoch, P. H.: Neurodynamics of Tics: The Nervous Child; Tics in Children. Vol. 4, No. 4, 1944-1945.
23. Wolfe, J. B. and Digilie, V. A.: Early Cardiac Signs of Childhood Rheumatism. *Clin. Med.*, 54:37, Feb. 1947.
24. Brown, E. E.: Ill Effects of Prolonged Recumbency in Paranasal Sinusitis. *ARCH. PEDIAT.*, 59:546, Aug. 1942.
25. Brown, E. E.: Cause of Cracking Joints; Relation to Weather and Fibrositis. *Northwest Med.*, 48:537, Aug. 1949.

407 N. Main Street

CHRONIC ABDOMINAL PAIN IN CHILDREN. H. R. E. Wallis. Practitioner, 174:579-583, May 1955. The diagnosis of chronic abdominal pain in children is often difficult, but can be ascertained in nearly every case. A careful history should be taken, with special reference to the milk supply (to check the possibility of tuberculosis or brucellosis) and the family history of convulsive disorders (in case of masked epilepsy). Examination should be directed not only to the abdomen but also to the nose, mouth, chest, and spine (upper respiratory infections, dental causes, referred pain). A tuberculin test should be performed. The urine should be examined microscopically, in case of renal stone or chronic pyelitis. Roentgenography may be indicated; a plain film of the abdomen, barium meal examination; barium enema, and intravenous and retrograde pyelograms may be used. Agglutinations for *Brucella abortus* and a brucellin skin test may help to elucidate some obscure cases. An electroencephalogram is indicated if no organic cause can be found and the disorder is paroxysmal. The cases in which pain is of psychic origin are few. They can often be elucidated by the child's own history, but it should never be presumed that pain is psychogenic until other causes have been ruled out. Finally, recurrent neutropenia is a possible, though rare, cause of chronic abdominal pain in children.—*J.A.M.A.*

DERMATITIS OF THE DIAPER REGION A NEW REMEDY FOR AN OLD AFFLICTION

HENRY W. KAESSLER, M.D.**

Bronxville — Mt. Vernon, N. Y.

Although "diaper rash" is commonly thought of as being nothing more than a disagreeable condition, lesions in this area frequently progress to secondary infection and ulceration or may become complicated by other superimposed skin diseases. The dermatitis is usually confined to the diaper region but may spread over the abdominal wall and down the thighs. Few children pass through infancy without episodes of this affliction, often despite the efforts of a conscientious mother.

A not uncommon belief exists that the constant friction between the skin and wet diaper brings about the eruption known as "diaper rash" and that adequate treatment has been instituted when the wet diaper is replaced by a dry one and some inert powder (such as talc powder) is sprinkled on the buttocks. The informed physician, however, knows that both the etiology and treatment of "diaper rash" is more complex.

The most frequent cause of "diaper rash" is irritation from ammonia which is produced by the action on urinary urea by the gram-positive *Bacterium ammoniagenes*, the bacteriologic and morphologic characteristics of which have been capably investigated and described.¹ This ammoniacal type of diaper dermatitis was originally described by Jacquet² in 1886. It is most marked on the convex areas of the skin and is distinguished by an attendant odor of ammonia from the wet diaper, particularly after the diaper has been well saturated during the night and has been worn for several hours. Occasionally the concentration of ammonia is high enough to make the mother's eyes tear when the diaper is removed.

The skin of a young infant is relatively delicate and excoriations and redness in the area of the buttocks may result from loose stools. This may serve as a starting point for an ammoniacal dermatitis. Also intertrigo, which involves the creases of the skin primarily, may predispose to "diaper rash." Furthermore, as a

*Baby Silicare Powder and Baby Silicare[®], the products of Revlon, Inc., were supplied for this study by the Pharmacal Div.

**Director, Richmond Sanitarium, Mt. Vernon, N. Y.; Chief of Pediatrics, Mt. Vernon Hospital, Mt. Vernon, N. Y.; Attending Pediatrician, Lawrence Hospital, Bronxville, N. Y.

superimposed complication, it is not uncommon to observe miliaria rubra (prickly heat rash) due to summer heat or overwrapping. This manifests itself as an acute inflammatory dermatitis due to keratin obstruction of the sweat glands. All of these entities are aggravated by a lack of cleanliness and improper diaper laundering, the home-laundered diaper being the more incriminating agent in this respect than those washed commercially.

MATERIALS AND METHODS

Because of the gratifying results achieved by Kahan³ and associates in the prophylaxis and management of diaper dermatitis (in 577 infants) by the use of an emulsion containing silicones, glyoxyl diureide and hexachlorophene† we decided to use a similar preparation in a fine talc base.* This product is essentially moisture repellent, mildly keratolytic and bacteriostatic.

In our investigation of 253 subjects (3 months of age and older), the majority were in a home for retarded infants and young children. The test was especially severe because of the acknowledged hypersensitive skin of the constitutionally inferior subjects. The test powder was used in the prevention of "diaper rash" in 127 and in the treatment of severe inflammation in the diaper area in 84. Of the latter, 17 were infants from private practice who had been treated previously, with other preparations, without success. The remaining 42 (control group) were treated with preparations normally used in routine hospital care. The study was conducted for a period of three months.

To insure maximum uniformity and cleanliness of diapers, those used in our study were laundered by a diaper laundry service and folded and prepared by one attendant assigned to this task. The diapers were liberally sprinkled with the test powder or "control powders," then folded and placed in colored baskets. The cribs and beds of the children were tagged with ribbons to correspond with the color of the baskets in which the diapers were delivered to the room, so that the nurses did not know which product was being used.

In our treatment group (84 cases) diapers were changed day and night, whenever necessary. With the test medicament, complete clearing of the diaper region was obtained in 100 per cent of cases. In one of the infants from private practice in whom the condition had been aggravated by prior treatment with other prepa-

rations, inflammation persisted but finally cleared. In the control group, only 8 of 42 subjects did not clear with the "control powders."

TABLE I.

	<i>No. of cases studied</i>	<i>No. of cases cleared</i>	<i>% Effectiveness</i>
Test product:	84	84	100%
Controls:	42	34	80.9%

Graphic demonstration of the effectiveness of the test powder was shown by approximately 15 series of before and after photographs which illustrate the reduction in intensity of color, size and area of the lesions.



BEFORE TREATMENT



AFTER TREATMENT

The time required for clearing varied from 6 days to 28 days in severe cases.

In our prevention group (127 cases), procedure for changing diapers in 51 cases was similar to that in the treatment group.

TABLE II.

<i>Prevention</i>	<i>No. of cases cleared</i>	<i>% Effectiveness</i>
51	45	88.2%
76	60	82.7%

To provide a more severe trial for the test product in the remaining 76 cases, diapers were changed only three times during the day and after a bowel movement, night or day. The subjects in the prevention group were clothed in winter sleeping garments at night and (when old enough) in corduroy overalls during the day.

In the prophylactic group (127 cases) the test product was less effective than in the treatment group with some inflammation

showing in 6 of 51 in whom diapers had been changed routinely and in 16 of 76 cases subjected to the unusually severe test as described.

The nurses involved in the study made the following comments on the physical qualities of the test product: nice feeling; coats well; clings well; pleasant odor; good adhesive quality.

Tolerance to the test preparation was entirely satisfactory in all cases. In more than two hundred 24-hour closed patch tests there were no positive reactions.⁴

DISCUSSION

Silicone preparations have been employed effectively not only in the prevention and treatment of "diaper rash" in infants,³ but also in adults with varying dermatoses, including subacute and chronic housewife's eczema and contact dermatitis of the hands⁵ and in the management of bedsores.^{6, 7}

The rationale for the efficacy of the preparation which we used in our investigation, and in the studies of Kahan³ and LeVan⁵ lies in the ability of silicone to repel moisture; the stability and nonirritant keratolytic qualities of diureide of glyoxilic acid which stimulates epithelial healing;³ and the effective and nonsensitizing bacteriostatic attributes of hexachlorophene. Not only infants with diaper dermatitis, as we have shown, but bed-ridden incontinent patients, young or aged, exposed for a sufficient length of time to irritation from ammonia produced by the action of bacteria on urinary urea, are likely to benefit from the new preparation.

SUMMARY

A baby powder, characterized by an unusual combination of properties—moisture repellent, keratolytic, and bacteriostatic—gave excellent results in the management of diaper dermatitis in 84 infants and children (100 per cent). It was also effective in the majority of 127 infants and children subjected to unusually severe conditions in whom it was used prophylactically. The preparation is nontoxic and nonsensitizing. It makes a desirable protective covering for all types of "diaper rash."

REFERENCES

1. Cooke, J. V.: *Am. J. Dis. Child.*, 22:481, 1921.
2. Jacquet, L.: *Rev. mens. de mal. de l'enf.*, 4:208, 1886.
3. Kahan, H., et al.: *Arch. Pediat.*, 73:125-129, April 1956.
4. Schwartz, H.: Personal communication.
5. LeVan, P., et al.: *Calif. Med.*, 81:210, Sept. 1954.
6. Brusca, D. D.: *New York State J. Med.*, 56:894, Mar. 15, 1956.
7. Bateman, M. B.: *Brit. M. J.*, 1:554, Mar. 10, 1956.

CLINICAL REVIEW

In order to encourage the writing of clinical articles by recent graduates or senior medical students, the ARCHIVES will publish monthly at least one such paper from the classes of Doctor Lawrence B. Slobody, at New York Medical College, New York, and Doctor Walsh McDermott, at Cornell Medical School, New York. Other interested medical schools are cordially invited to submit student papers for consideration.

CAPILLARY FRAGILITY OF THE NEWBORN INFANT*

STANLEY BURROWS, M.D.**

Boston, Mass.

This study was conducted with a twofold purpose. One was the standardization of a relatively new instrument for determining capillary fragility in the newborn with its anatomic and physiologic differences from the adult. Any instrument or test on a newborn should be standardized for the newborn. Adult standards are not applicable. The second purpose was to determine what factors maternal are present prenatally and nately which may influence the capillary fragility of the newborn.

TESTS OF CAPILLARY FRAGILITY

A capillary wall is not uniformly resistant. It has distinct areas of diminished resistance which may be made to open and allow particulate matter to leave the lumen of the vessel.¹ Capillary fragility tests depend upon the opening of these areas of diminished resistance either by positive pressure inhibiting venous return from the capillary bed, or by negative pressure applied to the tissues around the capillary bed. The former method results in an absolute increase of intravascular pressure, while the latter method causes a relative increase in intravascular pressure.

No test of capillary fragility is ideal. All are crude approximations of capillary resistance.^{2, 3} Furthermore, they are used to measure qualitatively general capillary resistance. Only a limited number of capillaries is present in the test area.⁴ Because of differ-

*This paper, fourth year student essay, was given Second Annual Award; from the Department of Pediatrics, New York Medical College, Metropolitan Medical Center, New York, N. Y.

**A Resident in Pathology at the Peter Bent Brigham Hospital, Boston, Mass.

ent stimuli applied, test results are influenced by the specific method employed.⁵ Capillary fragility is variable in the same individual from time to time,⁶ and from arm to arm.⁷

Although the negative and positive pressure techniques are consistent within themselves, their correlation is low. Therefore, the results given by the two methods are not comparable.⁸

Tey⁹ noted the following disadvantages of the positive pressure methods: (1) the determination is time consuming; (2) the tests cannot be repeated for days; (3) no gradation exists in the same subject; (4) the results cannot be read with accuracy, and (5) since only two arms are available, they are unsuited for pharmacologic investigation when several determinations are made within a few minutes. Schweppe, et al.,¹⁰ from tests conducted on a group of patients with hypertension, concluded that the Gothlin index, although showing less variability, is not as sensitive as the negative pressure method. Hines and Parker¹¹ believe that a negative pressure method is better for comparative results.

THE PETECHIOMETER

Since the introduction of the negative pressure technique by Hecht¹² in 1907, there have been many modifications. The instrument used in the present study was the Petechiometer®* shown to be accurate by Brown.¹³ The Petechiometer® is small, inexpensive, easily used and is calibrated for 100 mm., 200 mm. and 300 mm. of negative pressure. For comparison, the test must be performed on a similar skin area on each patient because the median capillary resistance values vary in different areas of the body.¹⁴ The upper regions of the body is more sensitive than the lower regions.¹⁵ Copley¹⁶ has recommended the internal brachial area noting that contiguous skin areas are not suitable because of increased thickness of the epidermis. An examination of the skin area for spontaneous hemorrhages is necessary before performance of the test to recognize prior hemorrhages.¹⁷ Only those petechiae developing in the center of the area covered by the suction cup are counted.¹⁸ The application of the suction is timed accurately, since a variation of a few seconds influences the result.¹⁹ Suction of more than two minutes may cause the petechiae to be obscured by edema.²⁰

*Trademark of Rexall Drug Co.

METHOD OF STUDY

One hundred and three newborn infants were selected at random in the nursery for newborn infants of the obstetrical service of Metropolitan Hospital. The duration of hospitalization of maternity patients and their babies is a minimum of three days following delivery, unless complications occur. All the newborn infants tested were four days of age or less.

The test site in every case was the anterior chest wall directly over the lower portion of the sternum. This area was selected as it satisfied the following requirements: (1) an almost flat skin area large enough to allow easy application of the 2 cm. suction cup; (2) an area of firmly attached skin to prevent a large mass of loose tissue from filling the suction cup upon the application of suction; (3) a skin area away from the diaper area to avoid irritation from urine and feces; (4) a skin area generally not subject to the trauma of birth directly; and (5) a skin area which is least subject to handling and irritation during the first few days of life.

The area was examined before the test to exclude prior spontaneous hemorrhages. A water soluble surgical jelly was applied to the rim of the suction cup before each test to secure an airtight fit to the skin. Three hundred millimeter of negative pressure was applied to the test area for one minute. Following the application of negative pressure the number of petechiae present in the center of the test area in one square centimeter of skin surface was counted.

Dark-skinned infants were not included in the test group due to the difficulty in reading the results in such patients. Also, infants showing any dermatitis in the test area were not tested.

All infants tested were considered in good physical condition by the obstetric and pediatric staffs. All were full term babies. None were in an incubator at the time of the test.

The following information was abstracted from the maternal history of every newborn infant tested: age of mother, number of times mother was pregnant, number of times mother carried a fetus beyond 28 weeks (parity), duration of first and second stages of labor, type of anesthesia used during labor and delivery, presentation and position of infant at delivery, brief summary of delivery. The following information was obtained from the chart of each newborn tested: sex, weight at birth, and, age at the time

of the test. All infants were tested before this information was obtained.

RESULTS

Reactions: Eighty-eight (85%) of the infants tested gave negative reactions, that is, no petechiae in the test area, while 15 (15%) showed one or more petechiae. Readings of the 15 infants with petechiae revealed:

- 11 infants with 1 petechiae per square cm.
- 2 infants with 2 petechiae per square cm.
- 1 infant with 3 petechiae per square cm.
- 1 infant with 5 petechiae per square cm.

Because the vast majority (85%) had shown no petechiae in the test area, any infant showing one or more petechiae was considered to have increased capillary fragility. No attempt was made to subdivide the group of positive reactors.

Sex: The sex of the newborn infant appeared to have no influence upon the capillary fragility. There was an equal distribution in both the normal and positive reactor groups.

<i>Infant</i>	<i>Male</i>	<i>Female</i>
No reaction	44 (50%)	44 (50%)
Positive reaction	8 (53%)	7 (47%)

Age: Age also appeared to have no influence on the capillary fragility:

<i>Infant</i>	<i>Age of Infant (Hours)</i>		
	<i>Youngest</i>	<i>Oldest</i>	<i>Average</i>
No reaction	3	90	38
Positive reaction	8	85	35

Birth Weight: Weight at birth was similar in both groups:

<i>Infant</i>	<i>Weight</i>
No reaction	7 pounds 0 ounces
Positive reaction	6 pounds 12 ounces

Mother's age: Age of the mother at the time of delivery was similar in both groups:

<i>Infant</i>	<i>Age (years) of Mother</i>
No reaction	23.7
Positive reaction	24.5

Presentation: The presentation at delivery was not different in both groups:

<i>Infant</i>	<i>Presentation</i>				
	<i>LOA</i>	<i>ROA</i>	<i>LOP</i>	<i>ROP</i>	<i>Breech</i>
No reaction	54(64%)	23(27%)	2(2%)	6(7%)	0(0%)
Positive reaction	8(53%)	5(33%)	1(7%)	0(0%)	1(7%)

Only a single infant was born by cesarian section and this infant gave a normal reaction.

Labor: Although the first stage of labor tended to be over two hours longer on the average in the group with positive reaction, the second stage averaged nine minutes longer in the group with no reactions. However, there was a wide variation in both groups so that neither difference can be considered significant.

<i>Infant</i>	<i>Average Duration of Stages of Labor</i>	
	<i>First Stage</i>	<i>Second Stage</i>
No reaction	10 hours 39 minutes	38 minutes
Positive reaction	12 hours 56 minutes	29 minutes

Parity of Mother: A difference was apparent when the parity of the mother was considered, that is, the number of times the mother had carried a fetus beyond age 28 weeks, including the infant tested. This was also reflected, but to a slightly lesser degree, in the number of times the mother had been pregnant, regardless of whether the fetus was carried to viability or not.

<i>Infant</i>	<i>Para (average)</i>	<i>Gravida (average)</i>
No reaction	2.7	3.0
Positive reaction	1.9	2.3
	<i>Primipara</i>	<i>Para of 4 or more</i>
No reaction	31 (35%)	25 (28%)
Positive reaction	8 (53%)	1 (7%)

Forceps: The incidence of forceps delivery was higher in the group of positive reactors:

<i>Infant</i>	
No reaction	15%
Positive reaction	40%

Infusions: A pitocin infusion was used in five deliveries. All five newborn infants were in the normal group.

Anesthesia: Although it was originally planned to compare the groups in regard to anesthesia administered during delivery, the anesthesia reports were often missing or uncertain.

DISCUSSION

Perry and Linden¹⁴ believe that results could not be compared unless tests were made on similar skin areas. In the present study the results in different test sites were identical. Therefore, although the variation may be considerable in the adult depending upon the test area, the variation is relatively slight in the newborn infant.

Abt, Farmer and Epstein²¹ reported an unusually high capillary resistance in the newborn infant. Moloney,²² however, found abnormal capillary fragility in 60 per cent of 55 newborns he tested with a Dalldorf instrument.

In testing adults just below the antecubital fossa, a Petechiometer® test should not be considered positive unless more than ten petechiae per square centimeter appear. Thirty-four per cent of a group of 120 patients older than 50 years of age, in Bird S. Coler Hospital and Home, showed greater than 10 petechiae per square centimeter. None of these patients had any condition known to have an influence upon capillary fragility.

The result, that none of the newborn infants showed more than 5 petechiae per square centimeter and 85 per cent of them showed none at all, is in agreement with Abt, et al.,²¹ that the newborn infant has a high capillary resistance.

Although Moloney reported that decreased capillary fragility in the newborn infant becomes normal in most instances by the fourth day of life, the present study shows no correlation between age of infant and the capillary fragility.

Moloney also noted that the duration of labor for infants with severe capillary fragility averaged 14 hours, compared to only 5 hours for all other infants. The present study did not show any marked difference in the duration of labor of both groups.

It is realized that the test group is too small to be of statistical significance. Therefore, the results of this study cannot be taken as conclusive, but merely suggestive.

The only factors possibly found to influence the capillary fragility were the parity of the mother and the use of forceps for delivery. Factors found to have little or no influence upon the capillary fragility of the newborn were sex and age of infant, weight of infant at birth, age of mother, presentation of infant, duration of labor, and use of pitocin infusion to stimulate labor.

A correlation with the parity of the mother may possibly be

explained on the basis of ease of delivery. A primipara will often have a more difficult delivery than a multipara. This may predispose such infants of primiparas to hemorrhage early in life, and require more careful observation for hemorrhagic tendencies. Conversely, hemorrhagic tendencies should be relatively rare in infants born of mothers with three or more previous pregnancies carried to term.

The correlation with forceps delivery does not imply that the increased capillary fragility was caused by the application of forceps.

SUMMARY

1. Tests of capillary fragility are reviewed.
2. Of 103 newborn infants tested for capillary fragility with the Petechiometer®, 15 showed increased capillary fragility.
3. The newborn infant has a high capillary resistance compared to the adult human being.
4. Factors which may possibly influence capillary fragility of the newborn infant are parity of the mother and the use of forceps during delivery. The correlation with forceps delivery is most likely due to the conditions which necessitated the application of the forceps rather than being due to the application itself.
5. Factors having little or no influence upon the capillary fragility of the newborn infant are, sex and age of the infant (up to 4 days), weight of infant at birth, age of mother, presentation of infant at delivery, duration of labor, use of pitocin to stimulate labor.
6. Hemorrhagic tendencies of the newborn infant should be relatively less common of mothers of higher parity.

REFERENCES

1. Landis, E. M.: The Passage of Fluid Through the Capillary Wall. *Am. J. M. Sc.*, 193:297, March 1937.
2. Capillary Fragility. *Times*, 76:100, March 1948.
3. Report of the Council on Pharmacy and Chemistry of the A.M.A.—Rutin. *J.A.M.A.*, 131:743, June 29, 1946.
4. Levitan, B. A.: Clinical Observations on the Effects of Injectable Rutin, Esculin, Adrenoxyl, and Vitamin E on the Capillary Fragility of Diabetic Retinopathy. *Am. J. M. Sc.*, 221:185, Feb. 1951.
5. Bini, F.: Capillary Fragility in Patients with Hypertension; Clinical and Experimental Study in Essential, Arteriosclerotic, Renal, and Diabetic Hypertension. *Riforma med.*, 66:92, Jan. 26, 1952.
6. Brown, E. E.: Diseases Associated with Low Capillary Resistance. *Am. Heart J.*, 34:241, Aug. 1947.
7. Geschwind, H. and Rundquist, N.: Tests Carried Out on 200 Persons with Gothlin's Method for Determining the Strength of the Skin Capillaries and Statistical Treatment of the Results. *Uppsala läkaref. förh.*, 40:403, 1935.

8. Bell, G. H.; Munro, H. N.; Lazarus, S. and Scarborough, H.: Capillary Fragility (Resistance): Negative- and Positive-Pressure Test Compared. *Lancet*, 2:536, Nov. 7, 1942.
9. Tey, A.: Die normale Kapillarfragilität beim Menschen. Eine neue Methode zu ihrer Bestimmung. *Schweiz. med. Wchnschr.*, 71:685, 1941.
10. Schweppe, J.; Lindberg, H. A. and Barker, M. H.: Experience with 3 Vascular Fragility Tests in Hypertension. *Am. Heart J.*, 35:393, March 1948.
11. Hines, L. E. and Parker, R. J.: The Effect of Ascorbic Acid on Capillary Fragility. *Quart. Bull., Northwestern Univ. M. School*, 23:424, 1949.
12. Hecht, A. F.: Experimentell-klinische Untersuchungen über Hautblutungen im Kindesalter. *Jahrb. f. Kinderh.*, 65:113, 1907.
13. Brown, E. E.: Evaluation of a New Capillary Resistometer: The Petchiometer. *J. Lab. & Clin. Med.*, 34:1714, Dec. 1949.
14. Perry, D. J. and Linden, I. H.: Studies of Methods of Determining Capillary Fragility. II. Negative Pressure Technique Using the Petchiometer. *J. Invest. Dermat.*, 20:251, April 1953.
15. Copley, A. L. and Kozam, G.: *J. Appl. Physiol.*, 4:311, Oct. 1951.
16. Copley, A. L.: The Ecchymosis Test for Capillary Hemorrhagic Diathesis. *Science*, 107:201, Feb. 20, 1948.
17. Daldorf, G.: A Sensitive Test for Sub-Clinical Scurvy in Man. *Am. J. Dis. Child.*, 46:794, 1933.
18. Hare, R. W. and Miller, A. J.: Capillary Resistance Tests. *Arch. Dermat. & Syph.*, 64:449, Oct. 1951.
19. Sack, G.: Ein neues Verfahren zur Prüfung der Zerreißlichkeit der kleinen Hautgefäße. *Klin. Wchnschr.*, 17:1539, 1938.
20. Yipoo, A.: Zum Entstehungsmechanismus der Blutungen bei Grubgebürten und Neugeborenen. *Ztschr. f. Kinderh.*, 38:32, 1924.
21. Abt, A. F.; Farmer, C. J. and Epstein, I. M.: *J. Pediat.*, 8:1, 1936.
22. Moloney, W. C.: The Occurrence of Abnormal Capillary Fragility in the Newborn. *Am. J. M. Sc.*, 205:229, Feb. 1943.

THE EPIDEMIOLOGY OF MYOPIA*

HUBERT S. BUSH, JR.

New York.

Myopia is defined as a form of refractive error in which parallel rays of light come to focus in front of the retina when the eye is at rest. Simple myopia of low degree is a variation within the normal limits of the optical system, and this eye should not be considered unsound or diseased.

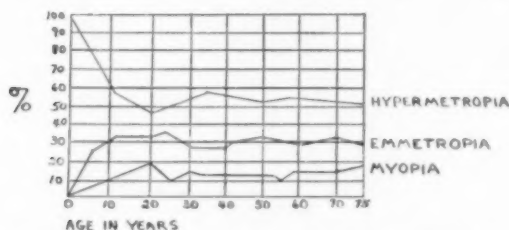
Pathological myopia (degenerative, malignant, high myopia) is the type of myopia accompanied by degenerative changes.

The derivation of the word "myopia" is from the Greek and means to half close the eyes, which is descriptive of the screwing up of the eye lids by myopes in an attempt to form clearer images.

The incidence of simple myopia is high but degenerative myopia is rare. The incidence depends on several variables: (1) Sex—equal in simple myopia, but females are more prone to degenerative myopia. (2) Race—for example, high degrees of myopia are more common in Chinese, Arabs, and Jews. (3) Age—the following table shows the development of refractive errors during life.¹³

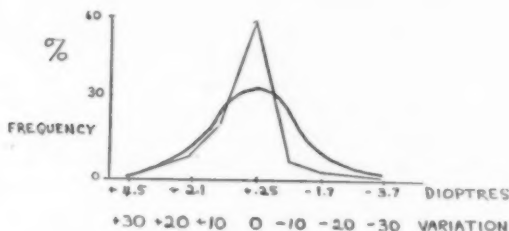
*Submitted as partial fulfillment of the requirements of the course from the classes of Dr. Walsh McDermott at Cornell University Medical College, New York City.

It can thus be seen that ametropia is more common than emmetropia and that hypermetropia is the most common ametropia.



- (4) Location—Less common in Western United States. (5) Occupation—greater incidence of myopia in college.

The incidence of true emmetropia is rare, however, when small refractive errors are disregarded the majority of the people are clinically emmetropic.¹⁰ (See Chart).



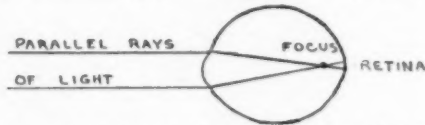
Relative incidence of refractive errors based on the examination of 12,000 eyes.

Pathologically, in myopia the dioptric strength of the eye is too great for the length of the eye or the eye is too long for its dioptric power.¹⁰

The typically myopic eye is somewhat larger and prominent with a deep anterior chamber and a large sluggishly acting pupil.

There are three main types of pathological myopia: 1. Axial—A.P. diameter longer than normal (most common). 2. Curvature—Curvature of the cornea is abnormally great. 3. Index—Index of refraction of the aqueous increased, index of refraction of the vitreous is decreased. In pathological myopia the eye is more egg shaped with the enlargement chiefly in the posterior pole. The degenerative changes in the fundus include: (1) the increased

angle of entrance of the optic disk, and the optic crescent; (2) supertraction of the retina over the nasal side of the disk; (3) atrophy of the choroid; (4) scleral actasias; (5) degeneration of



the vitreous, and detachment of the retina, and (6) Foster-Fuchs spots.

Some of the complications of severe myopia are (1) choroidal thrombosis and hemorrhages, (2) vitreous opacities, (3) retinal detachment (most common), (4) glaucoma, (5) cataract.

The psychological effects of not prescribing glasses in both simple and pathological myopia may be great. The person loses or never gains his appreciation of subtleties, and becomes introverted and peculiar. He may be considered dumb or backward at school and may be left out of physical activities.

The financial burden of frequent visits to the ophthalmologist and changes in strength of glasses is great for some families. There are also many inconveniences associated with wearing glasses which are bothersome to the myope.

The myope, without proper correction, is a potential menace to the community and to himself because of errors in judgment, particularly while driving an automobile.

The idea that developmental myopia arises from either excessive close work or general debility has pervaded much of the research on the etiology of myopia.

One view has it that the sclera becomes distended due to an inflammatory choroido-retinitis or sclero-choroiditis. This may be true in a small percentage of cases but in most instances pathology has shown that myopic changes are purely degenerative.¹⁰

Another theory is that the shape and configuration of the orbits result in deformation of the sclera. However, this work has not been confirmed by other investigators.¹⁰

Some felt that a short optic nerve would distend the posterior part of the globe and that this pull would be increased during reading which requires convergence and a downward rolling of the eyes. Further work has shown this to be unlikely and it is known that myopia is not an accompaniment of exophthalmos.¹⁰

Much attention has been given to the action of the extra-ocular muscles on the sclera. This muscle pressure was supposed to increase the intra-ocular pressure or cause venous congestion. The horizontal recti muscles were implicated particularly during convergence while reading. There is no positive experimental evidence for this and although the increase in intra-ocular tension is by no means inconsiderable, yet it is known that the lamina is not impressed and that myopia can develop where convergence is not possible.^{10, 13}

Contraction of the orbicularis oculi muscles during the squinting maneuver is believed by some to increase the intra-ocular tension and thus increase distension of the sclera. The explanation for the distension of the posterior pole of the globe alone, due to increased intra-ocular pressure, was attributed to the greater muscle support given to the anterior segment of the globe. It was postulated to be a growth of the eyeball under increased pressure rather than a stretching of what was already grown.^{10, 13}

Congestion of the sclera which would produce softening and distension was a popular hypothesis and was believed to be due to the dependent position of the head during close work. Myopia in workers who did much stooping was believed to be due to the same cause.¹⁰ Lindner believed that weakness of the sclera in the posterior pole is due to the action of metabolites. The eye strain effected the macular region where there were increased number of capillaries, increased metabolism, and decreased scleral protection.⁸

Another widely accepted theory is that of the intrinsic weakness of the sclera either due to heredity or environment. Among the environmental factors is the weakness often following illness or dietary deficiency among which tuberculosis, syphilis, anemia, endocrine disturbances, vitamin A and D deficiencies, as well as calcium deficiency are some. It has been described as a sort of "scleral rickets".¹⁰

Keith in 1925 postulated that disturbances of the pituitary gland caused sclerotic fibroblasts to lay down unsound material. The onset of myopia at puberty occurs at a time when the endocrine system is unusually active and unstable.¹⁰

Numerous studies have been done on the incidence of myopia among people who do close work and those of the same age and status in the general population. One study found that 31 per cent of the undergraduates wear glasses in England and that sight was

seen to deteriorate during the four years in the university. The better students had the poorer eyesight and those with the lowest visual acuity had the most marked deterioration in vision. Sight was four times poorer in the students than in those of similar age group in the general population.⁷ Lindner found that 48 per cent of the Catholic Clergy in the Vienna and Poelten Arch-Diocese were myopic. He assumed an environmental factor which occurred early or late in life. He felt school myopia was hereditary yet did not develop without the influence of an environmental factor. It should be kept in mind that people with myopia may gravitate towards higher education and positions which require close work because the nature of their defect makes them more suitable for close work than for other types of work.

Although there are many studies which would implicate near work as the cause of myopia, there are many reports which do not corroborate these findings. Blum attempted to determine the incidence of myopia in a population of 1065 Swiss draftees, arranged in groups according to the amount of close work, brain work, and manual labor. He came to the conclusion that close work was no factor in the etiology of myopia.⁴ Nearsightedness may not develop in spite of near work, or it may develop without near work, or it may only affect one eye.

Most ophthalmologists today tend to follow the hereditary theory of the etiology of myopia. It is commonly observed that refractive errors are frequently inherited. However, the mechanism of inheritance is not clear. This is because multiple factors are involved (curvature of the lens, refractive index of the vitreous, shape and size of the eyeball) and, therefore, the simple laws of inheritance do not hold. Small refractive errors seem to have a dominant transmission and large refractive errors recessive transmission. From the graph shown above it is seen that most children are hypermetropic at birth which would rule out congenital influences. Wold in his work on hereditary myopia found myopia in 2.7 per cent of newborn infants under seven days of age, and in 6.5 per cent of all children under six years. Thirty-five per cent of children were myopic from non-myopic parents, and 49 per cent were myopic with myopic parents.¹⁴ Similar statistics have been found by other investigators.

The biological theory of the origin of myopia explains the myopia as an overgrowth of the retina, and this overgrowth is geneti-

cally determined. In embryonic life the neutral ectoderm determines the growth of the eye, and proponents of this theory feel that after birth the retina remains the master tissue. As the process occurs, the retina enlarges and pushes towards the posterior pole of the eye, the sclera adapts itself to this growth, and becomes thinned. The choroid is made susceptible by this stretching to the degenerative changes seen in pathological myopia.¹⁰

Major differences in the degree of myopia are common in identical twins. In a group of sixteen cases reported by one investigator, there was twenty times the difference between the eyes of myopic twins as between emmetropic twins which would indicate that environment had a strong effect on the myopia in these cases.⁶

In anisometropes with unilateral myopia, an investigator theorized that each half of the body is inherited from a different parent. Anisometropia would thus occur in a child who had one parent with high myopia and the other with high hyper-myopia.³

The treatment of myopia, of course, depends on the theory of etiology followed by the doctor. The present concept for the treatment of simple and pathological myopia by the majority of ophthalmologists is the prescription of glasses giving full correction. One authority believes that "in simple myopia — whether adult or child, the extent to which glasses are worn, the amount of near work done, peculiarities of diet or the administration of drugs are immaterial provided hygienic conditions are good, overstrain is avoided, and general standards of good health and development are maintained."¹⁰ To those who have never worn glasses, full correction may not be comfortable because the patient is not accustomed to read by accommodating. To those who believe that excessive accommodation during reading is the cause of myopia, this undercorrection would seem like a more logical treatment. Glasses which enable the patient to read with the book further from his eyes and, therefore, cause less converging would satisfy those who believe that convergence during reading is the etiology of myopia. That glasses have a therapeutic effect is doubtful. There is some discussion as to whether they could prevent further myopia by eliminating eye strain has nothing to do with the progress of the disease, or accelerate the process.

As far back as 1583, Bartisch wrote chapters in his book on "protecting oneself from the need of glasses" and "ridding oneself of the habit of wearing them."¹⁰ In those days concave glasses

were believed to aggravate myopia. Today, this view is still held by the patient but to a lesser degree.

In 1920 W. H. Bates wrote a book on *Perfect Sight Without Glasses* which was the first effort of its type to be widely accepted. Aldous Huxley among others claimed improvement from the method. He had had bilateral keratitis at 16 years which left him with greatly reduced vision. This method was supposed to cure all ailments of the eye. Huxley admitted that he was unqualified to speak on these matters yet he tried to explain the physiological mechanism by which they worked, and in the attempt, alienated the ophthalmologists as have others who have claimed improvement or tried to explain the mechanism of this improvement.

The myope finds his glasses helpful but still inconvenient and has the desire to do more than to wear a crutch. The devotees of the myopia cures keep their interest in the sight training courses because of flashes of distinct vision which they experience. These flashes of distinct vision are frequently monocular and shift from one eye to the other. Some believe that it is a development of the squinting used by myopes. It is known that squinting will cause pin-hole effect and make things clearer. Making the pin-hole smaller than 1 mm. diameter is no longer of any help. However, improvement does occur during squinting while looking through a 1 mm. pin-hole held before the eyes, thus indicating another mode of action. Not all myopes use the same technique of squinting and they are not all aided by squinting. Beach suggests the use of akinesia of the orbiculars and retrobulbar akinesia of the extra-ocular muscles in an attempt to find a clue to the action of these muscles during the squinting mechanism.⁹

Post and Wood who investigated these training procedures believe that the improvement is due to a better recognition of blurred objects and that it was a cerebral improvement rather than on the retinal level. The improvement was of a definite but a limited value and there were some beneficial psychological reactions. This is the general feeling among ophthalmologists today. Cadets were able to pass the visual requirements during World War II by using these training techniques. One series of 54 patients with myopia were given a course in visual training preceded and followed by a complete ophthalmologic examination.

52% showed no change.

22% showed a definite improvement of 27%.

22% showed no appreciable change.¹¹

Another report on the results of visual training in 103 myopes showed similar results.

29% low grade improvement of 27%.

30% low grade improvement of 15%.

9% decrease in visual acuity of 9%.¹⁵

31% no change.

In general the training of an organ improves the skill of the functioning of the organ. In many cases the myopia is so slight that the patient does not realize that he needs glasses, and visual training in this case might be as helpful and more acceptable to the patient than prescribing glasses. Lancaster feels that "ophthalmologists have neglected this field (visual training) and have concentrated their attention on the primary source of the sensation, the image on the retina leaving to irregular, half-trained workers the cultivation of the field."¹²

Another part of treatment is to eliminate eye strain and allow the use of the eyes as a subconscious function. Eye strain is defined as "the symptoms experienced in the conscious striving of the visual apparatus to clarify vision by ineffectual adjustments."¹⁰ Eyes were adapted for simple purposes, to look for enemies and food, yet, in society today, their job is often unremitting close work. Vision is a relatively new development in evolutionary history and thus more subject to break down, especially is this true of the action of convergence. "It is unfortunate, however, that in a problem which concerns the environment as much as the individual, ophthalmologists have in general bent their energies almost exclusively to improving visual capacity by optical correction to the neglect of the equally important factors of environmental conditions and vocational demands made upon the eyes."¹⁰

There are special schools for myopes where the illumination is very good, the print large, the sense of touch relied on more than sight, and oral instruction takes the place of most of the reading. Duke-Elders feels however that "the amount of work should be adjusted to the general physical and mental development of the child rather than the degree of myopia."¹⁰

In cases where the myopia is steadily progressive and of a high degree, the patient should be steered into an occupation where visual acuity is less exacting and where he can continue to work even if his vision deteriorates to a low degree.

Operative treatment of severe myopia is an heroic procedure which should be performed only as a last resort. One operation

is the removal of the lens. This has been generally abandoned today. Another is sclerectomy — excising strips of sclera to shorten the globe.

Etiology of myopia remains unknown. There have been numerous theories postulated but none absolutely proven. The treatment today is to correct the defect with spectacles, and little has been done in prophylaxis or in curing the condition.

BIBLIOGRAPHY

1. The Influence of Environment and Heredity on the Development of School Myopia. Abstra. Dept., *Am. J. Ophth.*, 31:640, 1948.
2. Mechanical Factors in the Pathogenesis of Myopia. *Ibid.*, 35:1526, 1952.
3. Myopic Anisometropia and the Etiology of Myopia. *Ibid.*, 35:1226, 1952.
4. Myopia and Profession. *Ibid.*, 34:1772, 1951.
5. Myopia Prophylaxis. *Ibid.*, 35:1530, 1952.
6. The Role of the Environment in Myopia, a Statistical Study of Twins. *Ibid.*, 33:1318, 1950.
7. Sight of Undergraduates, Loss of Visual Acuity. *Ibid.*, 35:436, 1952.
8. Traction in Myopia and its Prevention. *Ibid.*, 33:658, 1950.
9. Beach, S. J.: Myopia Cures. *Tr. Am. Ophth. Soc.*, 45:284-294, 1948.
10. Duke-Elder, W. Stewart: *Textbook of Ophthalmology*, 4:4281-4287; 4:4313-4355, 1949.
11. Hildreth, et al.: The Effects of Visual Training on Existing Myopia. *Am. J. Ophth.*, 30:1563, Dec. 1947.
12. Lancaster, W. B.: *Arch. Ophth.*, 32:167, Sept. 1944.
13. Roemer, Paul: *Textbook of Ophth.*, pp. 801-825, 1914.
14. Wold, K. C.: Hereditary Myopia. *Arch. Ophth.*, 42:225-237, Sept. 1949.
15. Wood, A. C.: *Am. J. Ophth.*, 29:28, Jan. 1946.
16. Yale University Clinical Conference: Problems of Refraction. *Am. J. Ophth.*, 39:750, 1955.

GASTRIC DIGESTION OF HOMOGENIZED MILK IN INFANTS. A. Adam and E. Czech. (*Monatsschr. Kinderh.*, 103:361-365, Aug. 1955).

Although it is generally accepted that homogenized milk is more easily digested than ordinary cow's milk, the value of this milk in the feeding of infants is still being disputed. The authors decided to ascertain whether the quantity of gastric juice that is produced after feeding with homogenized milk differs from that produced after feeding of ordinary cow's milk. Their investigations were made on 18 infants, ranging in age from six weeks to eight months. Comparative tests were made with homogenized and nonhomogenized milk. By means of the sugar curve of the stomach, it was ascertained that in 15 of the 18 infants less gastric juice was required for the digestions of homogenized than for the digestion of nonhomogenized milk. In three of the infants the gastric sugar curves were atypical due to secretory anomalies of the stomach. On the basis of their observations, the authors conclude that homogenized milk deserves wider use in the feeding of infants.

PEDIATRICS AT THE TURN OF THE CENTURY

From time to time the Archives, which was the first Children's Journal in the English language, will reprint contributions by the pioneers of the specialty over fifty years ago. It is believed that our readers will be interested in reviewing such early pediatric thought.

STATUS LYMPHATICUS AND ENLARGEMENT OF THE THYMUS. WITH REPORT OF A CASE SUCCESSFULLY TREATED BY THE X-RAY.*

ALFRED FRIEDLANDER, M.D.**

Cincinnati, O.

For three-quarters of a century the literature has been filled with discussions as to the significance of the enlarged thymus. In the first half of the last century, due largely to the teachings of Kopp, the theory of the etiological relationship of hypertrophy of the thymus and laryngospasm gained wide credence. In 1858 Friedleben's monograph on the thymus, based upon exhaustive anatomical studies, appeared. Friedleben absolutely denied the possibility of the production of laryngospasm by an hypertrophied thymus, and even went so far as to deny entirely the idea of a thymic asthma. For many years Friedleben's views were accepted as correct. But while it was everywhere admitted that laryngospasm and enlarged thymus had nothing to do with each other, anatomical studies (by such authorities as Cohnheim and Virchow) and clinical observations by a host of careful observers were published in great numbers, showing not only that dyspnea from enlarged thymus is a possibility, but that true thymic asthma does actually occur. The discussion of the relationship of enlarged thymus and sudden death now became very active. To explain these cases of so-called thymic death, various theories, based on clinical, anatomical or experimental studies, were advanced. The possibility of such thymic death—by direct pressure

*Read before the Academy of Medicine of Cincinnati, March 18, 1907.

**At the time of writing this paper, the author was Chief Clinician to the Children's Clinic, Medical College of Ohio, University of Cincinnati; Attending Physician to the Children's Wards of the Jewish Hospital.

Reprinted from Archives of Pediatrics, 24:490-501, July 1907.

on the trachea with resulting asphyxia, by compression of the large vessels at the base of the heart, or of pressure on mediastinal nerves—was emphatically proclaimed, and the claims apparently substantiated by the anatomical findings. On the other hand, these theories were as vigorously denied by other observers whose reasoning and evidence seemed hardly less faulty.

New light was thrown on this vexed question of thymic death by the masterly monograph of Paltauf, published in 1889. As a result of his anatomical studies, Paltauf came to the conclusion that enlargement of the thymus constituted but one manifestation of an abnormal constitutional state. He found that in his cases of sudden death, without apparent cause, there was not only an enlarged thymus, but in addition a hyperplasia of the entire lymphoid apparatus. He found enlargement of the lymph nodes in various parts of the body, of the faucial tonsils, of the lymph follicles at the base of the tongue, of the intestinal follicles, together with enlargement of the spleen and hypertrophy of its follicles. In addition to these changes in the lymphoid system of the body, there was a characteristic find in the circulatory system. The aorta as well as the smaller arteries were smaller and thinner than normal, so that there was real hypoplasia of the entire arterial system. In some of the cases there were signs of acute dilatation of the heart; sometimes there was more or less degeneration of the heart muscle. In this broader conception the enlargement of the thymus was made to constitute but one manifestation of a general constitutional abnormality, and it is one of the brilliant achievements of Paltauf to have demonstrated that the enlarged thymus, in and of itself, could not produce death. In older patients showing the signs of this condition, Paltauf was able to show the blood picture of chlorosis, and so his name of lymphatic chlorotic constitution finds its justification. More commonly, perhaps, the condition is known as status lymphaticus. The claims of Paltauf found acceptance rather slowly at first, but the accumulated evidence of later years has abundantly justified his teaching, and today the status lymphaticus is generally recognized as a clinical entity.

The chief characteristics of this condition as formulated by Paltauf and generally accepted by pathologists and clinicians today may be briefly summarized as follows: Generalized enlargement of the lymph node groups in various parts of the body,

hypertrophy of the tonsils, of the follicles at the base of the tongue and of the intestinal follicles, enlargement of the spleen and its follicles, the presence of a thymus of variable size—in some cases a persistent thymus at a time of life when normally the thymus has atrophied. In addition there is found a narrowing and thinning of the walls of the aorta and of the rest of the arterial system. With this there may be signs of acute cardiac dilatation, that is, a large, soft, pale heart muscle, showing in some cases the beginnings of degeneration. These individuals are usually of pale, pasty habitus; and in older patients the blood picture of chlorosis is constant. Sudden death is extremely common in these cases at all ages, either as the result of apparently insignificant trauma, or occurring without assignable cause. It is noteworthy that in children with status lymphaticus, the prognosis of the acute infections is much more serious than in normal children, in that sudden death at any stage of the affection is frequent. Furthermore, it is now known that patients with status lymphaticus take anesthetics very badly. Many of the cases of death under anesthesia are in reality attributable to this underlying constitutional abnormality. Death may occur either just at the beginning of the administration of the anesthetic—during narcosis—or just after the exhibition of the anesthetic is concluded. It is thus a matter of importance to determine if possible, before an anesthetic is to be given, whether status lymphaticus exists. Status lymphaticus, as such, produces no definite subjective symptoms. Where there is an enlarged thymus, definite symptoms (ordinarily pressure symptoms) may manifest themselves. Congenital stridor, cough or attacks of thymic asthma may supervene and may aid in the establishment of the diagnosis.

With reference to the diagnosis of status lymphaticus *intra vitam*, there has been, even in recent years, much discussion. In the case of children, the observations of Escherich and Daut have found general acceptance, in that they note a peculiar pasty, heavy, anemic habitus, with an appearance not unlike that of rickets or scrofula at times. The demonstration of the lymphatic hyperplasia is, of course, not difficult. The enlargement of the superficial lymphatic glands, of the tonsils, of the follicles at the base of the tongue and of the spleen, can, of course, be made out easily, and these findings are of great diagnostic importance. Particular stress is to be laid on the finding of an enlarged thymus. While

it is claimed by a few clinicians, even today, that the diagnosis of enlarged thymus—*intra vitam*—is exceedingly difficult, or well nigh impossible, the general trend of opinion would incline to the view that such a diagnosis can be made with absolute certainty. Biedert and v. Mettenheimer have shown that where marked hypertrophy of the thymus exists in young children, inspection may show a protrusion of the upper part of the sternum. Various authors have noted that on palpation in the jugulum a distinct tumor mass can be felt. The percussion finding is of the greatest importance, even though it be admitted that enlargement of the anterior mediastinal lymph nodes may, in older individuals, cause possible confusion. It is generally accepted, as Biedert has shown, that the normal area of thymus dullness, even in young children, ought not to extend beyond the limits of the sternum to any great degree. A most careful study of this question of thymus dullness, and its normal and pathological limits, has been made by Blumenreich. This study included a large series of children, observations being taken both during life and after death. One feature of particular value in Blumenreich's work was that, in many instances, he was enabled to study the thymus dullness in the same child, ante- and post-mortem, so that he could compare and verify results. Blumenreich came to the following conclusions: In young children there is a definite form of thymus dullness, in the shape of an irregular triangle or truncated cone, whose base is the sternoclavicular junction and whose apex is the second rib. The sides extend but very slightly beyond the margins of the sternum, slightly more on the left than on the right side. Dullness extending more than 1 cm. on either side, concealing the note of pulmonary resonance between the heart dullness and the normal area of thymus dullness, shows, in the absence of other causes, an enlarged thymus. Simply engorged lymph nodes in the anterior mediastinum cause no dullness, while caseous nodes do. It is noteworthy that percussion dullness in cases ante- and post-mortem was practically the same.

Hochsinger has made a careful radiologic study of the thymus with reference to the relation of enlarged thymus to congenital stridor. While the radiosopic picture of the normal thymus, as obtained by Hochsinger, does not agree in all respects with the findings of Blumenreich, he, too, holds it to be settled that where the thymus shadow "extends much to the left of the sternal

margin, the gland must be considered to be enlarged." Hochsinger, in fact, lays a great deal of stress on the percussion finding, using it as a control for the interpretation of his radiograms. Indeed, he says specifically that "marked broadening of the shadow, particularly a covering over the right side of the heart shadow to any considerable degree, occurs *only* in cases with thymus hypertrophy demonstrable by percussion." Later on he says again: "In 26 of these cases we were able to demonstrate hypertrophy of the thymus by percussion, and in all of these cases the radioscopic examination showed a broadening of the thymus shadow."

Definite symptoms are not to be expected in infancy in these cases, unless the picture of compression by the enlarged thymus, or definite thymic asthma, supervenes. The existence of a congenital stridor, the onset of cough, without physical signs in the lungs, the occurrence of definite asthmatic attacks, with extreme dyspnea and cyanosis, in the absence of cardiac lesions, should excite suspicion, and the finding of the physical signs as above detailed will justify the definite diagnosis.

The therapy of this condition has hitherto proven most unsatisfactory. For a long time treatment was wholly symptomatic; indeed, many observers are even today of the opinion that there is no known method of therapy that can be of avail. Thus Ohlmacher, writing in 1906, says that "except for the treatment indicated for rickets when this disorder is combined with status lymphaticus, we have at present no therapeutic resources for the latter condition."

In view of the fact that the enlarged thymus is doubtless responsible for many of the symptoms, attention has for some time been directed to this gland. Whether the symptoms of thymic asthma are produced by direct pressure on the trachea (a point concerning which there has been almost endless discussion), whether the pressure effects are exerted on the large vessels, on the heart itself, or on the mediastinal nerves, or whether, finally, Svehla's theory of hyperthymization is correct, it appears to be indubitable that in some way the pressure of the enlarged thymus exercises a pernicious influence and does produce some of the cardinal symptoms of the condition. Accordingly, many therapeutic efforts have been made in the direction of counteracting the effects of the enlarged gland. Many clinicians have sought to

overcome the pressure effects of the enlarged thymus, which in some cases apparently can produce a tracheostenosis, by low tracheotomy. These efforts, as in the case reported by Carter, for instance, have been uniformly unavailing. Solis-Cohen, referring to the known antagonism of the action of thyroid and adrenals to the thymus, has suggested that the use of thyroid and adrenal might be of possible therapeutic value, a suggestion which, so far as I have been able to learn, has not been followed by results. On the other hand, Escherich finds as a basis for the constitutional anomaly, an autointoxication resulting from abnormal functions of the thymus, and therefore suggests feeding these patients thymus gland. In addition, various authors have recommended general tonic treatment—sea baths, iodid internally and externally over the region of the thymus, etc.

Surgical intervention has been apparently successful in some cases. Thus Siegel reports the case of a boy, two and one-half years old, with attacks of thymic asthma for five weeks preceding his admission to hospital. Tracheotomy was done without avail. The introduction of a long cannula gave relief, but the cannula caused ulceration and had to be removed. Two months later the anterior mediastinum was opened and it was seen that the thymus moved up with every respiration. The gland was sutured to the periosteum of the sternum at the jugulum. Complete relief was afforded. Koenig, in the case of a three-months child that had thymic dyspnea from its second week, extirpated part of the gland and sutured the rest to the sternum, while Purruker extirpated the entire thymus, with perfect recovery, relief from pressure symptoms and without reported ill effect.

In 1903 Heinecke published the results of his studies on the effects of the x-ray on lymphoid structure. He exposed young animals for varying periods on successive days, and then later killed the animals and studied the changes in lymphoid tissues. He found that in young animals (guinea pigs, rabbits and dogs) changes in the spleen occurred very promptly. There was a marked increase of pigment, disintegration of many cells and reduction in the size of the Malpighian bodies. With this, there was rarefaction of the cellular elements of the spleen pulp. It is noteworthy that these changes occurred before any skin lesions took place. Analogous changes to those seen in the spleen follicles occurred in all the lymph node groups of body, in the follicles

of the intestine and, in very young animals, in the *thymus*. He adds that "it is *possible* that in the human being analogous changes in lymphoid tissue might occur without any reaction of the skin. This might be of therapeutic value. One might try this therapeutic measure in cases in which an abnormally large thymus is the basis of the trouble."

The case to be reported is of interest, both because of the clear clinical picture presented and also because the hitherto untried experiment of treatment of an enlarged thymus with the x-ray was astonishingly successful.

E. M., male, was born December 3, 1904, the first child of healthy parents. There was neither tuberculosis nor syphilis in the direct antecedents. Labor was not especially difficult — forceps were not required. Examination by the accoucheur showed an apparently normal infant, birth weight $6\frac{1}{2}$ pounds. The mother's breasts did not secrete and the child was therefore artificially fed from the first, diluted cow's milk being given. I saw the child for the first time when it was three weeks old, having been consulted because the food mixture did not seem to agree with it. A cursory examination made at this time was negative. The food formula was changed and consent given to the circumcision of the child. The circumcision had no bad effect, though the surgeon reported the hemorrhage as having been rather profuse. As stated, the birth weight was $6\frac{1}{2}$ pounds. On December 24 the weight was 6 pounds, 12 ounces. On December 31 this had risen to 7 pounds, 4 ounces, which was also the weight on January 7. About this time the mother noticed that the child had a slight cough, and that there was a peculiar whistling noise during inspiration. On January 9, (the child then being five weeks old) the cough had become worse and was noticeably paroxysmal in character. During these paroxysms there was some cyanosis, especially of the face and upper extremities.

Careful examination of the child made at this time, in conjunction with Dr. F. Forchheimer, revealed the following condition: The child lay on its back with head retracted. The face was pale, lips bluish, expression anxious. Rectal temperature normal. Respirations were shallow, 70 to the minute, with marked retraction of the diaphragmatic border on inspiration, and distinct inspiratory stridor. A short, dry cough was frequent.

At intervals there were definite paroxysms, asthmatic in character, lasting from five to ten minutes. Examination of the lungs was absolutely negative, except for occasional large moist rales at the bases posteriorly. The heart sounds were clear. There was distinct dullness over the upper portion of the sternum, extending laterally from the margin of the bone about 2 cm. to the right. This dullness extended downward more than 2 cm. below the level of the second rib. On the left the dullness extended beyond the margin of the sternum fully 3 cm., and merged into the area of cardiac dullness. On deep palpation in the jugulum, a rounded firm mass could be distinctly felt. The liver was not enlarged. The spleen was just palpable. At this time the anterior and posterior cervical, the axillary and the inguinal lymph nodes could be easily felt, being about the size of large peas.

Based on the finding of the greatly enlarged thymus, with the cough, the inspiratory stridor, the asthmatic attacks, the pressure cyanosis, the enlarged spleen and lymphatic glands, with absence of cardiac or pulmonary lesion, the diagnosis of status lymphaticus and enlarged thymus was made. The only medication ordered at this time was sodium bromid in 1 grain doses.

During the next few days the child's condition grew steadily worse. The cough increased in frequency, and the asthmatic paroxysms became worse. At times these paroxysms lasted over an hour, being accompanied by marked cyanosis and leaving the child completely exhausted. Indeed, on several occasions after these paroxysms it seemed that respirations would cease. The child took its nourishment well, though the taking of the bottle frequently brought on a paroxysm. Sleep was usually restless, being broken by the cough, which continued even in the intervals between the paroxysms. The bowels were constipated, but the stools obtained by enemata were practically normal. The urinary secretion was free, the urine normal. On January 20, (the child being then seven weeks old) it was noted for the first time that there was distinct dullness in the right interscapular space. Above this area of dullness, which was about the size of a silver dollar, there was distinct bronchial breathing, this being the only spot where bronchial breathing could be heard. The temperature at this time, as previously, was normal. This dullness in the interscapular space was, of course, attributed to enlarged bronchial lymph nodes, the bronchial breathing being

due to compression of the lung above. The enlargement of these nodes was considered as only another manifestation of the status lymphaticus.

Up to this time treatment had consisted in the use of sodium bromid and iodid (given internally in the form of iodonucleoids) and inunctions over the thymus, of iodine-vasogen. During the paroxysms, oxygen inhalations had been used freely, though they did not seem to be of much avail. At this time codein phosphate in doses of $\frac{1}{400}$ grain was given every four hours. The effect on the cough was not particularly noticeable. Except for the appearance of marked edema of the hands and feet, the next few days saw no change in the child's general condition.

The rather desperate character of the case had been fully explained to the parents, who expressed their willingness to allow any possible therapeutic measure to be tried. It was, therefore, decided to try the effect of the x-ray. On January 30 an x-ray apparatus was installed in the house and the first treatment given by Dr. W. H. Crane. The child was laid on its back and a sheet of lead with fenestrum was placed so that the opening left the region of the thymus exposed. The time of the first treatment was one minute. The child was then turned, and the sheet of lead so arranged that the right interscapular region was exposed. The treatment to this region lasted one minute also. No changes in the child's condition in any particular were noted after the treatment. The second treatment was given on February 1, the exposures being three minutes each, anteriorly and posteriorly. On the day following the second exposure, my notes show that there were several bad paroxysms, as well as cyanotic attacks without cough. On February 4, the signs of cardiac dilatation were distinct. The codeia was stopped and Tr. strophanthus, $M \frac{1}{8}$, ordered *t.i.d.*

February 6.—The circulation was much better. The color was good. Four minute exposures were given anteriorly and posteriorly.

February 8.—Five minute exposures given. The area of dullness in the right interscapular space was distinctly smaller in size.

February 10.—Five minute exposures. The general condition was decidedly improved. The cough was less frequent, and the paroxysms shorter and less severe.

February 12.—Five minute exposures. This was the seventh treatment. There was *no* dullness to be made out in the interscapular area. The area of the thymus dullness on this day was noticeably smaller in size than it had been. The cough was less frequent. This was the first day without any paroxysm.

X-ray treatments were given on the 15th, 18th, 21st, 24th and 27th of February. During this time the condition continued to improve. The paroxysms became fewer in number and much less severe. During two of these days there were no paroxysms. On several occasions during this period, it happened that the child was able to sleep from one feeding period to the next undisturbed. The inspiratory stridor disappeared completely.

Examination on February 27 showed perfect resonance in the right interscapular space. The area of thymus dullness had diminished decidedly and did not extend laterally on either side of the sternal margin more than 1 cm. It was now possible to define, clearly, the upper limit of cardiac dullness. Over the bases of the lungs there were a very few mucous rales. There was no cardiac dilatation. The edema of hands and feet had completely disappeared.

From this time on, the child's condition became steadily better, and its development was apparently that of a normal child. The child's weight had been practically stationary from December 31 to February 11, a period of six weeks. On February 18, by which date nine x-ray treatments had been given, a gain of 10 ounces was noted. Thereafter the gain in weight was steady and exceedingly rapid. At six months the weight, 15 pounds, 13 ounces, was much more than double the birth weight ($6\frac{1}{2}$ pounds), and at a year, the weight, 20 pounds, 8 ounces, was more than triple the birth weight. Dentition was normal as to time and the eruption of the teeth occurred without difficulty. During the first year there was at intervals a slight cough without paroxysms and without cyanotic attacks. Otherwise the child showed no abnormality.

Shortly after its first birthday the child had a sharp attack of follicular tonsillitis, which yielded promptly to the salicylates. It was noted, however, that after the attack the tonsils remained persistently large. During the second year there were two more attacks of tonsillitis, and by November 1906, the tonsils had grown so large that they almost touched each other. Accordingly

in December 1906, both tonsils were removed by Dr. S. E. Allen. At the same time, a small mass of adenoid vegetations was cut away. No anesthetic was given. The child stood the operation very well, hemorrhage was not especially profuse, and healing was prompt.

At this writing, February 1907, the child is a large, well-developed, exceedingly active boy. Mentally he is fully up to the standard. Except for a certain paleness of the skin and for occasional attacks of rather dry cough, he presents no demonstrable abnormality. The case is unusual partly because of the possibility of making the definite diagnosis of status lymphaticus based on the classical signs and the definite symptoms of thymic asthma; still more perhaps because of the remarkably successful results of the experimental use of the x-ray therapy. The child is now perfectly well and so far as we can tell absolutely normal.

That the x-ray produced a diminution in the size of the thymus and of the bronchial lymph nodes does not admit of question. The facts that the subsequent development of the child has been normal, that the external lymph nodes and spleen are no longer enlarged, are indisputable.

Again, the fact that the child could successfully withstand such a trauma as the removal of tonsils and adenoids without shock would speak for a resistance fully up to the normal. Under all circumstances, therefore, the results of the x-ray therapy with reference to the enlarged thymus are most gratifying and encouraging. The procedure is of course infinitely simpler than the removal of the thymus by surgical means, and it would seem justifiable to hope that in the x-ray we have a valuable therapeutic resource for the treatment of what has hitherto been considered an almost desperate condition.

DEPARTMENT OF ABSTRACTS

Conducted by

MICHAEL A. BRESCIA, M.D., NEW YORK

WATKINS, C.: THE USE OF RESERPINE IN CEREBRAL PALSY. (Southern Medical Journal, 49:1488, Dec. 1956).

Reserpine is not effective against the primary neurologic defect in cerebral palsy. The drug has a tranquilizing effect in certain individuals handicapped by cerebral palsy, similar to its effect in other states. Because of this effect, the drug is of benefit in two conditions: (a) the child with cerebral palsy having overt psychiatric symptoms; and, (b) in relieving tension associated with difficult and frustrating training activities. We believe that reserpine has a definite place as an adjunct to the physical therapies in children handicapped by cerebral palsy, and who in addition have frank psychiatric problems with tension. We believe that the addition of reserpine to the treatment program will in some cases result in a definite increase in benefit observed from the physical therapies. Intensive controlled studies to test the effectiveness of reserpine are indicated. Such tests should be made ideally upon inpatients.

AUTHOR'S SUMMARY.

WOLFF, A. M.; SHAUGHNESSY, H. J.; CHURCH, R. F.; MILZER, A.; JANOTA, M.; OPPENHEIMER, F.; MORRISSEY, R. A.; NAFTULIN, H.; CHAPMAN, J. W. and LEVINSON, S. O.: IMMUNOGENICITY IN CHILDREN OF ULTRAVIOLET-TREATED POLIOMYELITIS VACCINE. (Journal American Medical Association, 161:775, June 30, 1956).

Ultraviolet-irradiated poliomyelitis vaccine found to be free of active virus by application of rigorous safety tests was found to be capable of stimulating satisfactory levels of neutralizing antibodies to all three types of poliomyelitis virus in young children, a high percentage of whom had no detectable antibodies prior to vaccination. These antibody levels persisted well for at least a year. A booster dose of vaccine administered about a year after primary immunization effectively stimulated rises in antibody levels in those with low titers. Some individuals, however, appear to possess levels in those with low titers. Some individuals, however,

appear to possess or reach a usually high ceiling level of antibody titer, after which injections of vaccine have little effect.

AUTHORS' SUMMARY.

SHWACHMAN, H. and GAHM, N.: STUDIES IN CYSTIC FIBROSIS OF THE PANCREAS. A SIMPLE TEST FOR THE DETECTION OF EXCESSIVE CHLORIDE ON THE SKIN. (*New England Journal Medicine*, 255:999, Nov. 22, 1956).

A new test for detecting the approximate chloride content of the skin surface is described. The test medium is composed of silver nitrate and potassium chromate suspended in an agar base. The majority of healthy and sick children yielded a one-plus reaction, whereas 138 of 140 patients with cystic fibrosis gave a three-plus reaction that was due to the increased chloride content on their skin. It is safe to assume that a patient who yields a one-plus reaction under ideal conditions for the test does not have cystic fibrosis. The application of this rapid, inexpensive and painless procedure for a mass screening program is indicated. In performing the test one should be careful to ascertain the reliability of the test plate by using adequate controls. Environmental and other conditions affecting the patient, which in turn alter the chloride content on the skin, must be considered in the interpretation of the test.

AUTHORS' SUMMARY.

d'Abreu, A. L. and Parsons, C.: Surgical Treatment of Children with Coarctation of the Aorta. (*British Medical Journal*, 4989:390, Aug. 18, 1956).

Evidence is presented to show the prognosis of coarctation of the aorta. If a baby has coarctation and symptoms of heart failure, and if the failure is slow to respond to medical treatment, death is probable within the course of a few months unless treated surgically. During a period of five years, at the Children's Hospital, Birmingham, 30 infants died from coarctation within 6 months of birth. During the remainder of the first decade, a child with coarctation appears to be comparatively safe, but the hazard to life increases again at puberty and the chances of reaching the age of 40 are poor. Operation has proved easier and safer in children than in adult subjects, and has usually been followed by a fall of blood pressure which has been progressive for a period of several weeks. Stricture formation may follow operative treatment; two examples of this are given. We believe that the second half of the first decade is the best time to operate on cases of coarctation.

AUTHORS' SUMMARY

BOOK REVIEWS

Conducted by

MICHAEL A. BRESCIA, M.D., NEW YORK

CONGENITAL ANOMALIES OF THE VISCERA. THEIR EMBRYOLOGICAL BASIS. By J. Lewis Bremer, M.D. Cloth. Pp. 202. Illustrated. Price \$5.00. Cambridge, Mass.: Harvard University Press, 1957.

This is the type of book that one likes to read during serious moments. Although embryology is usually considered a "dry" subject, this book is written for the clinician and keeps in mind the clinical applications of the development of the human body and, the deviations from the normal. In doing this, the author demonstrates the embryological reasons for the abnormalities as they are found. The book is valuable and would make a worthwhile contribution to any library.

M.A.B.

CHILDREN'S EYE PROBLEMS. By Emanuel Krinsky, M.D. Cloth. Pp. 175. Illustrated. Price \$6.00. New York: Grune & Stratton, Inc., 1956.

This small volume delineates the common and some of the not so common eye conditions that one might see in infants and children. The most valuable part of the volume is the discussion, in various sections of the book, of the examination techniques of the eye particularly as they apply to children. In this regard, the book is most helpful to the pediatrician to whom the book apparently is aimed. The author has done a commendable job in explaining a difficult field so that it becomes more easily understood by his colleagues in other specialties.

M.A.B.



GIVE
a crippled child
A CHANCE

through EASTER SEALS

SEND CONTRIBUTIONS TO

**NATIONAL SOCIETY FOR
CRIPPLED CHILDREN AND ADULTS, INC.
11 SOUTH LA SALLE STREET • CHICAGO 3, ILL.**

when *sniffles*
hit the
classroom

AND
NASAL CONGESTION
MAKES YOUNGSTERS
MISERABLE



*Designed
specifically
for children**

**Prompt and
Prolonged Decongestion
Sinus Drainage and Aeration**

NO STING • NO SEDATION • NO EXCITATION

**Plastic Unbreakable Squeeze Bottle
Leakproof, Delivers a Fine Mist**

**Also well suited for adults who prefer a mild spray.*

Winthrop

LABORATORIES • NEW YORK 18, N. Y. • WINDSOR, ONT.

Neo-Synephrine (brand of phenylephrine) and Zephiran (brand of benzocaine)
are trademarks of Winthrop Laboratories, Inc., New York, N.Y.